

remained in the nest, and the few that were about seemed agitated and stung virulently. Probably the mass of them had been driven off or eaten by the woodpeckers. The tunnel the latter had made was about two inches in diameter and four inches long, bored horizontally in, and ending in an irregular-shaped egg-chamber about ten and a half inches in cross diameter, but narrowed by the branch of pyingado which pierced the nest through and through, and crossed the egg-chamber diagonally. The bottom of this chamber alone was smooth, but there was no lining, and the two translucent white eggs of the woodpecker had rested on the bare boards, so to speak, of the ants' house. In the excavations *ccc* made by the ants themselves there were neither eggs, larvæ, nor pupæ; probably these all had been removed when the woodpeckers invaded the nest.

CHARLES BINGHAM,

Deputy Conservator of Forests, British Burmah  
Henzada, British Burmah, April 12

### Staminody of Petals

The cases of staminody of petals not being very frequent, it may be of interest to draw the attention of the readers of NATURE to such a modification as observed in *Fuchsia*.

The places of the four petals of the flower examined are occupied by four almost colourless filaments of an average length of three-fifths of an inch. Each of them bears on its top a nearly circular dark red lamina of three-tenths of an inch diameter. These laminae are so strongly vaulted as to have the shape of a segment of a globe, the hollow side being turned outward, the convex inward. At the base of the lamina, *i.e.* at the top of the filament, a short protuberance is seen, resembling in external shape the lower part of an anther. This anther occupies the concave side of the lamina and is consequently turned outward. Though the anther of one of the petals is only slightly developed, yet it may be admitted as a matter of fact that, instead of petals, this flower has produced four stamens, whose anthers bear a petaloid appendage. A microscopic examination, namely, showed not only the peculiar composition of the anther-wall, but also the presence of pollen-grains.

Of the stamens, properly so called, the outer whorl is present, but the inner one is only represented by two of the four. One of these two is inserted in the ordinary way, *viz.* at the base of the petal. The second, however, has grown together half way up with the petal's filament; there it has, in consequence of a spiral turning, arrived at the back side of the petal, whence it bends obliquely outward. By this union the impression is created of a stamen rising from the back of the (modified) petal, concealing its anther in the lamina's concavity. This occurrence brings to recollection the case of *Monarda fistulosa* as cited by Maxwell T. Masters from Turpin ("Vegetable Teratology," p. 208), with this difference, however, that what is probably only adhesion is mistaken for petalody, whilst the case above described offers an antheroid petal grown together with a true stamen.

J. C. COSTERUS

Amsterdam, May 4

### Catalogue of Fossil Mammalia in the British Museum, Part I.

IN the review of the above work in a late number of NATURE (vol. xxxi. p. 597) the reviewer entertains such a complete misapprehension of my system of naming the premolar teeth of typical heterodont Eutherian mammals that I must beg space to correct it.

The reviewer asserts that this system is untrue because it implies that in general with a smaller number than the full complement of four premolars the diminution must have commenced with the first, proceeded with the second, and so on. In reality it implies nothing of the kind, and if he had taken the trouble to turn to pp. 152 (No. 39,732) and 174 (No. 48,787) he would have seen instances where I have mentioned the absence of the middle teeth (*pm.2* and *pm.3*) and the retention of the terminal teeth (*pm.1* and *pm.4*). Similarly in the "Palæontology Indica," ser. 10, vol. iii. p. 48, I have adopted the same system for the incisors, and have shown that in *Hippopotamus* it is *i.2*, and not *i.3*, that disappears in some species.

I am well aware that in many of the Insectivora and Chiroptera there is often great difficulty in deciding on the homology of the individual premolars when these are reduced in number; and the reviewer might have noticed that in the former

order I have not ventured to definitely determine the position of any tooth in advance of the last premolar. Among the Chiroptera I have considered the three premolars of *Vespertilio* (p. 13) as homologous with the last three of the typical series, as there is apparently no evidence to the contrary; the small size of *pm.3* indicates, however, that an allied genus may retain only *pm.2* and *pm.4*; but the minute size of the one tooth in advance of *pm.4* in *Rhinolophus* has induced me to regard it as *pm.3*, although it may be *pm.2*.

The advantage of the system employed in the "Catalogue" is well instanced when we contrast the premolar dentition of *Canis*, and *Lepus* or *Theridomys*; the homology of the last tooth of this series (and there is only one in *Theridomys*) being at once seen, whereas it is entirely lost if we employ a method like that used in Dr. Dobson's "Catalogue of Chiroptera," where the actual first tooth in each genus is called the first of the series. I claim for the system adopted by myself every advantage in those cases where it is possible to determine the homology of the individual premolars in any form in which the number does not exceed four; and even in cases where such determination is not absolutely certain, the error can be but very slight, and does not lead to the utter confusion caused by the system (or, rather, the want of system) which I presume the reviewer would prefer.

When we come to those mammals in which the number of premolars is more than four, my system fails; and, in view of this, some German writers have adopted the plan of numbering the premolars the reverse way—*i.e.* terming the premolar next the first molar *pm.1*, and then counting towards the incisors. Although this system would be advantageous if we could always be sure of the division between the premolars and molars in homœodont mammals; yet it has several disadvantages, and has not, therefore, been adopted.

In reference to the suggestion of your reviewer, that instead of making a catalogue of the fossil Mammalia in the collection of the British Museum (as I was instructed to do by the Museum Authorities), I should have made one of all the known species of fossil Mammalia, any person having the slightest pretence to any knowledge of the present state of mammalian palæontology would have at once known that it would be utterly useless to attempt any such work at the present time, when new species and genera are being made almost daily, and a host of those already made are as yet but empty names.

As a minor matter, I may mention in regard to the lower jaws of *Crossopus*, alluded to in the review, that their identification rests solely on the authority of Prof. Sir R. Owen, and that perhaps I have acted in a too conservative spirit in admitting them.

Harpenden Lodge, May 2

RICHARD LYDEKKER

### Fossil Insects

"THE Earliest Winged Insects of America; a Re-examination of the Devonian Insects of New Brunswick in the Light of Criticisms and of New Studies of other Palæozoic Types," is the title of a *brochure* by Mr. S. H. Scudder, of Cambridge, Mass., recently published.

These Devonian insects are fragments of five wings; a sixth is now dropped, as "too imperfect for any satisfactory discussion," though in 1881 its description filled about two quarto pages. These insects have been, since 1865, so often discussed that their literature is a rather voluminous one. A number of far-reaching conclusions elaborated by the author would have to be abandoned if the determination of the insects should be proved incorrect. This I endeavoured to do in *Bull. Mus. Comp. Zool.*, viii. No. 14, Cambridge, 1881, and in NATURE, xxiii. p. 483. The principal aim of the author's new paper is to show that my determinations are erroneous. Concerning his statement that I have studied in nature only the (in most cases poorer) reverses, I may remark that his paper gives nothing more, after his study of the obverses; even less for *Gerephemera*.

These Devonian insects have been decidedly unfortunate from the very outset. Eminent palæontologists denied their Devonian origin, and put them to the Carboniferous or to the "Ursa Stufe" of the sub-Carboniferous. One of the insects, *Xenoneura antiquorum*, said to possess a stridulating organ on the wing, caused an unusual sensation. Poetic palæontologists were delighted to be introduced by this insect to the sounds of the Devonian woods. Now these woods are silent again, except in some text-books. "It does not appear reasonable," said the author, "to maintain

my former hypothesis of a stridulating organ." Everybody acquainted with such organs will be of his opinion.

Another insect, *Homothetus fossilis*, was said to have a small basal vein, considered to be homologous with the arculus of the Odonata, and therefore to form a connecting link between Neuroptera and Pseudoneuroptera. A new synthetic family, Homothetidae, was proposed. But now a re-examination of this wing convinces the author "that he had been mistaken about this arculus." It does not exist at all.

The third insect, *Platephemera antiqua*, was determined by me as the apical half of the wing of a gigantic dragon-fly. As this is the only species claimed now by the author to belong to the Ephemerae, he defends vigorously his determination by four objections:—(1) "In no dragon-fly, living or fossil, is there found beyond the nodus between the mediana and margin, more than a simple longitudinal vein, the marginal vein." If the author will examine any Odonate wing from below, he will find such a vein, which is the prolongation of the subcosta, bent on the nodus to the marginal vein, and running close to it. Near the nodus it is more widely separated in larger species. (2) "The reconstruction of the wing, after the dimensions given by Dr. Hagen, would, on the most favourable showing, make a wing of ridiculously extravagant appearance." But such forms occur in living species of Tramea, Rhyothemis, &c. (3) "The narrowing of the second cubital space is a common feature in Ephemerae (six genera after the Rev. Mr. Eaton's plates are quoted); and, as this varies in different species of the same genus, it seems to be a very unimportant matter." I had purposely stated *suddenly narrowing*, and this does not exist at all in Ephemerae, namely not in the six quoted genera, and cannot therefore vary in the different species of the same genus. It exists in Odonata. (4) "The sector subnodalis does not run unbroken to the tip, as in all dragon-flies I have examined, but is lost in reticulation shortly before the margin." This last-quoted character is a very common feature in dragon-flies (Tramea, Rhyothemis, &c.). Only *very exceptionally* this sector runs unbroken to the tip in the large sub-family of Aeschnidae (cf. De Selys's "Revue des Odonates d'Europe," p. 122).

As all objections have been proved to be incorrect, and only based upon insufficient knowledge of the venation of Odonata and Ephemerae, Platephemera belongs by the simple evidence of facts to the Odonata. The new proposed family of Palephemerae dies unborn, and the conclusions made from Platephemera are without value.

The fourth species, Gerephemera, gives much trouble to the author, and he is now inclined to bring it into the same group with the Protophasmida. As only a part about 4 mm. broad can be said to exist in both figures (Brongniart and Scudder) which could be compared, and as this part contains only a few sectors running to the margin, the relationship of Protophasma to Gerephemera is not at all obvious. The reverse of Gerephemera contains more than the author has seen. The basal part of a hind wing to the sector trigonali inferior, the basal part of a front wing with the same sector, and some veins belonging, probably, to another (front?) wing. The part figured and described by the author belongs, probably, to the other hind wing. No student of Odonata will be in doubt that Gerephemera belongs to this family, perhaps near Isophlebia. His statement "that the superior origin of the branches of the sector medius is entirely inconsistent with an Odonate hypothesis, and is the most salient point in the wing," is directly recognised as an error by looking at the figures in De Selys's "Monograph Calopterygines" (cf. Cleis, Vestalis, Neurobasis, &c.). This statement is only surpassed by the emphatic repetition "that the marginal would then be an elevated, and the mediastinal a depressed, vein, which combination is never the case." This statement is just the contrary to what exists in all Odonata—unless it is preferred to examine the wings from beneath.

There exists still no monograph of the Sialidae; therefore it is impossible to make conclusions and form new families for the other three Devonian species. The opinion on the Devonian insects given by Rev. A. E. Eaton (NATURE, vol. xxiii, p. 507) is still very just: "Palaeontologists have adopted a ridiculous course with regard to some insect fossils. Whenever an obscure fragment of a well-reticulated insect-wing is found in a rock, a genus is straightway set up, and the fossil named as a new species. The species is then referred to the Ephemerae, and is immediately pronounced to be a synthetic type of insects at present distantly related to one another in organisation. This enunciation of synthetic types is often nothing less than a resort

at random conjecture respecting the affinities of animals which the writer is at loss to classify. I thought that the Ephemerae had served quite long enough as an asylum for fossil cripples. I wished to intimate gently, that refuse of other groups of insects should be henceforth shot elsewhere."

Cambridge, Mass., March 12

H. A. HAGEN

### High-Level Stations

IN NATURE, vol. xxxii, p. 17, I find the abstract of an address by Mr. Omond, on "Ben Nevis." There are many points of interest, but I regret that one was not mentioned—viz. the exceedingly rapid decrease of temperature with elevation from Fort William to the Ben, anything nearly approaching, in middle latitudes, being only found on the Brocken, and all high-level stations of the Alps showing a much smaller decrease. At the Brocken, as well as at the Ben, the great difference from the Alps is not in summer, but in the colder months of the year. The reason seems to lie in the nearly constant winds, which bring air from below, which is cooled by ascension. The cases of great dryness of the air with descending currents in anticyclones in the colder months of the year, when isolated mountains are often much warmer than the valleys,<sup>1</sup> are comparatively rare in the North of Scotland, but frequent in the Alps, and certainly must and do have a great influence on the mean temperature. Where they are frequent, as in the Alps—especially the eastern—the mean amount of decrease of temperature with elevation must be slower.

I think all meteorologists will concur with me that the greatest points of interest in the Ben Nevis station is the study of the meteorological phenomena near the centres of cyclones, as no high-level station in the world is so favourably situated as this for this study.

A. WOEIFOK

St. Petersburg, May 1 (13)

### Rainbow Phenomena

YOUR correspondent Mr. C. Croft (NATURE, No. 811, p. 30) has noticed phenomena which are perfectly familiar to students of physical optics. The internal bands of colour within the primary bow are the "supernumerary" bows due to diffraction. They were described by Langwith in the *Philosophical Transactions* for 1722: a partial theory of them was given by Young in 1804, and a complete theory by Sir G. Airy in 1836. The illumination of the sky in the regions within the primary and without the secondary bows, and also the relative darkness of the space between the two bows, Mr. Croft will find the desired explanation in any elementary treatise on optics; Osmund Airy's Geometrical Optics may be cited as giving a good account of these matters. The particular bow seen by Mr. Croft appears to have been of unusual brilliancy; did he notice any of the radial streaks, which I described in 1878 as frequently accompanying rainbows?

SILVANUS P. THOMPSON

Finsbury Technical College, May 16

### Aurora

LAST night at about 10.30 to 10.35 p.m. there was a well-marked aurora visible from here. It did not last long, the bright bands fading rapidly into a general glow towards the north. The wind, which was easterly yesterday, has gone round to north-west to-day with tendency to rain and low temperature.

J. P. O'REILLY

Royal College of Science for Ireland, Stephen's  
Green, Dublin, May 14

### Red Hail

MR. W. H. MITCHEL, of Newry, has sent me the accompanying note, which he thinks may be of interest to the readers of NATURE.

C. EVANS

Downshire Hill, Hampstead, N.W., May 18

On May 7, Mr. R. A. Mullan, solicitor, of Newry, was driving in a gig near Castlewellan, co. Down, when he was overtaken by a shower of hail. To his surprise he observed that some of the hail-stones—perhaps one in a hundred—were of a

<sup>1</sup> This is well explained in the "Handbuch der Climatologie" of T. Hann. See also my paper in the *Zeitschr. f. Meteorologie*, 1883, pp. 211, 241.